IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Sunyx Surface Nanotechnologies GmbH

Serial No.: 09/869,123

Group Art Unit:

Filed: December 22, 1999

Examiner:

Title: Ultraphobic surface

Declaration under 37 C.F.R. § 1.132

Assistant Comminssioner for Patents
Washington, D. C. 20231

Sir:

I, Dr. Karsten Reihs, hereby declare as follows:

1. I am a citizen of Germany, residing at Leyboldstr. 58, 50968 Köln.

2. I studied chemistry at the University of Göttingen and received a PhD degree in Physical Chemistry in the year 1989.

3. Since 1989, I have been employed as a Research Scientist in the field of Surface Science and I am currently the Managing Director for the firm of Sunyx Surface Nanotechnologies GmbH.

4. The following comp ative tests were carri d out at the Fraunhofer Institut Angewandte Optik nd Feinmechanik, Winzlaer Straße 10, 45 Jena.

All tests were carried out as follows:

1. Based on the data given in examples 1, 7, 8 and 10 of Clark (US 5,674,592) regarding the height of the nanostructure elements, the tip diameter of the nanostructure elements and the areal number densities of the nanostructure elements, a height profile $z(x,y)=z_{m,n}$ of an array of discrete elongated nanostructure elements was calculated using the program Microsoft EXCEL. The density of calculated points was m=n=512 points in both x and y direction; i.e. 262.144 points per calculation.
   With this high density of points, the given structure of the nanostructure elements can be modeled sufficiently accurate. The number of nanostructure elements was 25 or 36 on an area as given in Table 1. In the model the nanostructure elements were coated with a hydrophobic substance equivalent to $C_8F_{17}(CH_2)_{11}SH$.

2. The height profile $z(x,y)=z_{m,n}$ was processed in exactly the same manner as described in the application (see text as originally filed, page 14, line 23-27 and page 25 line 1-22 and page 29 line 6-19):

   The height profile data were converted to the averaged power spectral density PSD according to equations 1 and 2 of the publication by C. Ruppe and A. Duparré, Thin Solid Films 288 (1996) page 9. To cover the entire frequency range up to 1000 μm^{-1} two PSD curves were combined in accordance with a procedure described in C. Ruppe and A. Duparré, Thin Solid Films 288 (1996) page 10-11. The frequency-dependent amplitudes were determined by the formula given in the present patent application, page 29 line 6-19. Amplitudes at frequencies smaller than the base frequency f_b of the discrete nanostructure elements are $a(f<f_b)=0$. Finally, the integral of the function

$$S(\log f) = a(f) \cdot f$$

was calculated between the integration limits $f_1/\mu m^{-1} = -3$ and $f_2/\mu m^{-1} = 3$ yielding data given in Table 1.

3. From Table 1 it can be clearly seen that even though the examples of Clark (US 5,674,592) show advancing and receding contact angles for water greater than 150°, none of the examples calculated shows values for the integral greater than 0,5, as can be seen from the last column of Table 1. Examples 1, 7, 8, 10 have been chosen, because they show very high contact angles for water according to Clark.

4. All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true, and further, these statements were made with the knowledge that wilful false statements and the like, so made, are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code, and that such wilful false statements may jeopardize the validity of the patent application or any patent issued thereon.

Feb. 4, 2003
(date)

(name)